

GIMBAL-MOUNTED HYDROELECTRIC TURBINE

Abstract

A power plant extracts energy from a free flowing motive fluid by means of a turbine mounted on a gimbal. The shroud element of the fluid intake has external rudders, in conjunction with the gimbal mounting, enabling the enclosed turbine to instantaneously respond to changes in the direction of the free flowing motive fluid thus ensuring the face area of the intake is always physically orthogonal to the direction of the motive fluid streamlines. The shroud element may also be buoyant so as to optimally extract energy from an upper non-turbulent and higher velocity layer of the free flowing motive fluid. To function within an inherently unsteady source of energy, the preferred embodiment of the turbine is coupled to a DC generator which may further be coupled to a voltage and current regulating circuit which either charges a battery, performs electrolysis of water to produce hydrogen fuel, or is further coupled to a DC motor coupled to an AC generator. Alternatively an AC induction generator may be coupled to the turbine. Other mechanical, electrical, electronic, or electromechanical fea-

tures may optionally be implemented to perform such tasks as adaptively locating the turbine in the maximum velocity flow, adapting internal vane and runner blade pitches for various flow rates and loads, keeping the intake free of obstructions, preventing loss of aquatic life, controlling and communicating the state of charge of the battery, or gauging and controlling the electrolysis process and communicating the fullness of the hydrogen gas output tanks.